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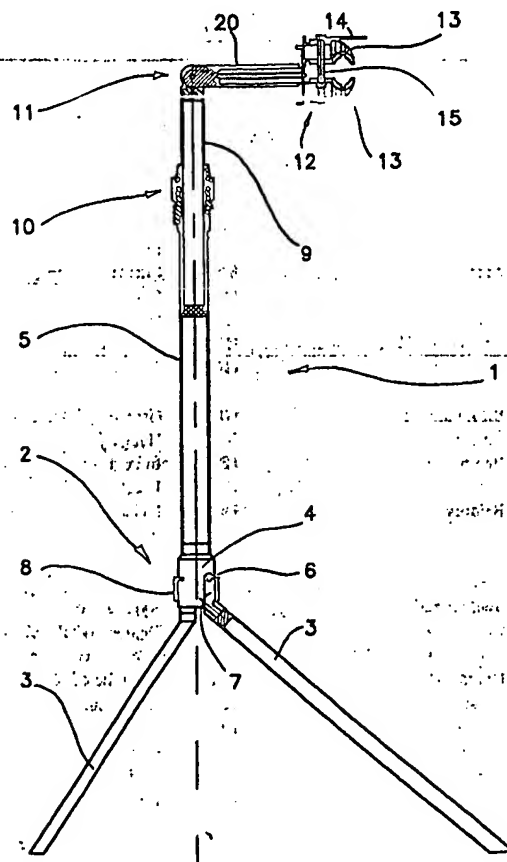
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## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<b>(51) International Patent Classification 6 :</b> B62H 3/02, F16M 11/28, 11/10, B62H 1/00	<b>A1</b>	<b>(11) International Publication Number:</b> WO 99/33695 <b>(43) International Publication Date:</b> 8 July 1999 (08.07.99)
<b>(21) International Application Number:</b> PCT/EP98/08436 <b>(22) International Filing Date:</b> 23 December 1998 (23.12.98) <b>(30) Priority Data:</b> MO97A000232 23 December 1997 (23.12.97) IT <b>(71) Applicant (for all designated States except US):</b> FEMAK DI FARINA MARCELLO & C.S.N.C. [IT/IT]; Via Toscana, 3/B, I-41050 Montale Rangone (IT). <b>(72) Inventor; and</b> <b>(75) Inventor/Applicant (for US only):</b> FARINA, Marcello [IT/IT]; Via C. Boni, 10, I-41050 Montale Rangone (IT). <b>(74) Agent:</b> CRUGNOLA, Pietro; Luppi & Crugnola S.r.l., Viale Corassori, 54, I-41100 Modena (IT).		<b>(81) Designated States:</b> AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).  <b>Published</b> <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>

**(54) Title:** SUPPORT MEANS**(57) Abstract**

The support means for a bicycle frame comprises a base (2) which may be steadily coupled to a reference plane, a support body (5, 9, 20) projecting upwards from said base (2) and clamp means (12) capable of clamping a portion of an object (24) that is to be supported; the base (2) comprises a plurality of feet (3) coupled to said body (5, 9, 20) by means of hinges and rotatable from an open position in which they are remote from said body (5, 9, 20) and a closed position in which they lie substantially parallel to said body (5, 9, 20).



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### Support means

The invention concerns support means, that is an implement for supporting an object, particularly a two-wheel vehicle, such as a bicycle.

The prior art comprises worktables on which bicycles are positioned for maintenance, or disassembly of parts that are to be repaired or substituted.

There are also known bicycle supports provided with a fork which may be engaged by the axle of the forewheel.

The known supports are inadequate because they are somewhat difficult to be used and may be used only in a workshop in view of their structure and dimensions.

It is an object of the present invention to provide support means, particularly for bicycles, which overcomes the above mentioned deficiencies.

According to the invention, there is provided support means, particularly, but not exclusively, for a bicycle frame, comprising a base, a support body projecting upwards from said base and clamp means for clamping a portion of an object to be supported.

The use of clamp means makes the clamping of a portion of a bicycle frame body particularly easy and stable.

Preferably, the support body has an elongated shape and the base consists of swinging feet, which are hinged in such a way as to be rotatable from an open position to a closed position, at which the feet are folded along the outer surface of the support body.

So the closed position is particularly compact and the handling and transport of the support means are considerably simplified.

In an advantageous embodiment, the support body is telescopic so that the overall dimensions of the support means may be considerably further reduced in the closed position.

In addition, the clamp means are advantageously provided with angularly positioning means, in order to allow an user to position in the most convenient way the object to be

supported.

The invention will be better understood and carried into effect with reference to the attached drawings which illustrate, as an example, an embodiment of the invention, in which:

Figure 1 is a longitudinal section of a support implement in an open operative condition;

Figure 2 is a longitudinal section of a support implement in a closed transport condition;

Figure 3 is an interrupted and enlarged, longitudinal section of a clamp fixed at an end of a support arm of the implement, in an open condition;

Figure 4 is a section as in figure 3, but showing the clamp only, in a closed condition;

Figure 5 is a section through a line V-V in Figure 3;

Figures 6 and 7 are front interrupted views of the clamp in a closed condition on a tubular element;

Figure 8 is an enlarged and interrupted section of an upper portion of the body of the support implement;

Figure 9 is a longitudinal section of a lower portion of the body of the implement;

Figure 10 is a section through a line X-X in figure 9.

A support implement 1 comprises a base 2 consisting of three feet 3 each provided with an angled end 7 hinged to an end element 4 of a tubular body 5 by means of a respective pin 6.

The angled ends 7 are arranged in such a way as to allow a ring 8 to be coupled to the outer surface of the feet 3, in order to keep them in an open condition, and to allow the feet 3 to be aligned parallel to the axis of the tubular body 5,

when they are in a closed condition, as shown in Figure 2. The tubular body 5 is telescopic, i.e. the tubular body 5 accommodates a further tubular body 9 which is slidable at the inside of the tubular body 5 and may be locked by ring nut locking means 10 fixed at the end of the tubular body 5 opposite to the end element 4.

The further tubular body 9 is provided, at its end projecting

from the tubular body 5, with a hinge joint 11 connected to an arm 20 which may be rotated through 90° with respect to the longitudinal axis of the tubular bodies 5 and 9, in order to reach a position substantially perpendicular to said longitudinal axis and substantially parallel to the surface on which the feet 3 rest, when the implement 1 is in the open condition. When the arm 20 is in said position, the hinge joint 11 is positioned in such a way as to prevent the arm 20 from returning into the tubular body 5. The end of the arm 20 opposite to the hinge joint 11 is provided with clamp means comprising a pair of jaws 13 which may be opened and closed by means of a lever 13 acting on a screw 15.

Figure 2 illustrates, in particular, that the end of the arm 20 bearing the clamp means 12 is provided, at the base of the clamp means 12, with a stop disk 16 free to make limited axial movements on the arm 20, due to the action of a return spring 17, which passes through a hole 41 of the disk 16 and connects a pin 40 of the disk 16 to the hinge means 11 through a fixing screw 42 connected to the hinge means 11. Said movements allows an outer rim 18 of the disk 16 turned towards the hinge means 11 to engage the ends 19 of the feet 3 when the implement 1 is in the closed condition.

Figure 3 illustrates that the disk 16 is fixed to the body 21 of the clamp means 12, which is fixed to the body 21 and to one of the jaws 13, engaging an end portion of the screw 15. The other jaw 13 is supported to a mobile guide body 22 which engages the other end of the screw 15 and may be drawn in a direction F along the axis of the screw, to open or close the jaws 13.

A conical spring 29 wound on the screw 15 is interposed between the jaws 13, in order to keep the jaws spaced apart from one another.

As shown in figure 4, the jaws 13 have an inner surface 23 shaped in such a way as to allow the jaws 13 clamp a bicycle frame element 24.

Angularly positioning means 25 capable of angularly

positioning the clamp means 12 with respect to the arm 20 are provided on the surface of the disk 16 opposite to the clamp means 12. The angularly positioning means 25 comprises a tubular element extending at the inside of the arm 20 and centred with respect to the arm 20 by means of rings 26. The end of the tubular element opposite to the disk 16 is provided with indentations 27 large enough to engage an appendix 28 projecting from an end of the hinge means 11, said appendix consisting advantageously of a screw peg. In such a way, if the clamp means 12 are drawn out from the arm 20 against the action of the spring 17, it is possible to rotate them with respect to the arm 20 in order to position the jaws 13 in a desired position with respect to the surface on which the feet 3 rest. This makes possible to adjust angularly the position of the frame element 24 in the direction shown by the arrows of Figure 6 and 7, or in the opposite direction, so that the user may position easily the bicycle for maintenance or for repairing parts of the bicycle. In addition, the particular shape of the angularly positioning means 25 allows a stable angular position to be obtained, said position being kept steady by the coupling of one of the indentations 27 with the appendix 28.

As shown in figure 8, the ring nut locking means 10 comprises a ring nut body 31 which may be grasped by the user and engaged in a screwed portion 32 of a sleeve 33 secured by means of a screw 35 to an end of the tubular body 5 opposite to the end provided with the feet 3. The ring nut body 31 is provided with a conical end 34 capable of pressing a friction element 36 against a portion of the outer surface of the arm 20. The friction element 36 consists of a conical bush which has a peripheral interruption making the bush elastically expandable and shrinkable and is provided with an annular relief 39 which engages a corresponding annular seat of the sleeve 33 and acts as anti-disengagement means for the bush when the arm 20 and, if necessary, the further tubular element 9 are caused to slide axially at the inside of the tubular

body 5.

Figures 9 and 10 show that the hinge pins 6 of the angled elements 7 of the feet 3 are inserted forcibly into portions of the end element defining recesses 37, capable of fitting a member 38 of each angled element 7. The member 38 has an outer surface comprising cylindrical portions, in order to be able to be coupled to the inner surface of the ring 8, with or without interference. All that in order to obtain a steady positioning of the angled elements 7 and feet 3 in the open position.



## CLAIMS

1. Support means comprising a base (2), a support body (5, 9, 20) projecting upwards from said base (2) and clamp means (12) for clamping a portion of an object (24) to be supported.
2. Support means suitable for supporting a bicycle frame, comprising a body (5, 9, 20) which may be telescopically coupled to clamp means (12).
3. Support means according to claim 1, or 2, wherein said base (2) comprises a plurality of feet (3) hinged to said body (5, 9, 20) and rotatable from an open position remote from said body (5, 9, 20) and a closed position in which said feet (3) lie substantially parallel to said body (5, 9, 20).
4. Support means according to claim 3, wherein each of said feet (3) has an end (7) inserted in respective recess means of said body (5, 9, 20).
5. Support means according to any of preceding claims, wherein stabilising means (8) are provided for stabilising said feet (3) in the open position.
6. Support means according to claim 5, and one of claims 3, or 4, wherein said stabilising means comprise a ring (8) arranged outside said body (5, 9, 20), free to slide axially with respect to said body and capable of engaging the outer surfaces of said ends (7) with its inner surface.
7. Support means according to any of preceding claims, wherein said body (5, 9, 20) comprises a tubular member (5) capable of receiving axially and telescopically a further member (9).
8. Support means according to claim 7, wherein ring nut fixing means (10) are interposed between said tubular member (5) and said further member (9).
9. Support means according to claim 8, wherein said ring nut fixing means (10) comprises an elastically expandable bush (36) provided with anti-disengagement means (39) capable of preventing said bush (36) being disengaged from a sleeve body

(33) secured to said tubular member (5).

10. Support means according to claim 8, wherein said further member (9) is provided with an extension shaped as an arm (20).

11. Support means according to claim 10, wherein hinge joint means (11) is interposed between said further member (9) and said arm (20).

12. Support means according to claim 10, or 11, wherein said arm (20) is so dimensioned as to be able to be telescopically accommodated at the inside of said tubular member (5).

13. Support means according to any of preceding claims, and further comprising angularly adjusting means (25, 27, 28) for adjusting and securing the position of said clamp means (12) with respect to said body (5, 9, 20).

14. Support means according to claim 13, wherein said angularly adjusting means (25, 27, 28) comprises an element (25) arranged at the inside of said arm (20), fixed to said clamp means (12) and capable of being positioned in angularly preestablished positions with respect to the arm (20).

15. Support means according to claim 14, wherein said element (25) is provided with longitudinal indentations (27) capable of engaging stationary reference means (28) of said arm (20).

16. Support means according to claim 14, or 15, wherein said element (25) is elastically slidable in said arm (20) owing to elastic means (17).

17. Support means according to any of preceding claims, and further comprising lock means (18) for locking said feet (3) in said closed position.

18. Support means according to claim 17, wherein said lock means comprises a rim (18) associated with said body (5, 9, 20) and turned towards said feet (3).

19. Support means according to claim 18, wherein said rim (18) is fixed to said clamp means (12).

20. Clamp means (12) capable of being coupled to a bicycle frame, characterised in that they are capable of being

telescopically coupled to support means (5).

21. Clamp means (12) according to claim 20, and further coupled to an arm (20) which is so dimensioned as to be able to be telescopically accommodated at the inside of said support means (5).

22. Clamp means (12) according to claim 21 wherein said arm (20) is coupled to a further arm (9) by means of hinge joint means (11).

23. Clamp means (12) according to claim 22, wherein said further arm (9) is so dimensioned as to be able to be telescopically accommodated at the inside of said support means (5).

24. Clamp means (12) according to any of claims 20 to 23, and further comprising angularly adjusting means (25, 27, 28) for adjusting and securing the position of said clamp means (12) with respect to said support means (5).

25. Clamp means (12) according to claim 24, wherein said angularly adjusting means (25, 27, 28) comprises an element (25) arranged at the inside of said arm (20), fixed to said clamp means (12) and capable of being positioned in angularly predetermined positions with respect to the arm (20).

26. Clamp means (12) according to claim 25, wherein said element (25) is provided with longitudinal indentations (27) engaging stationary reference means (28) of said arm (20).

27. Clamp means (12) according to claim 25, or 26, wherein said element (25) is elastically slidable in said arm (20) owing to elastic means (17).

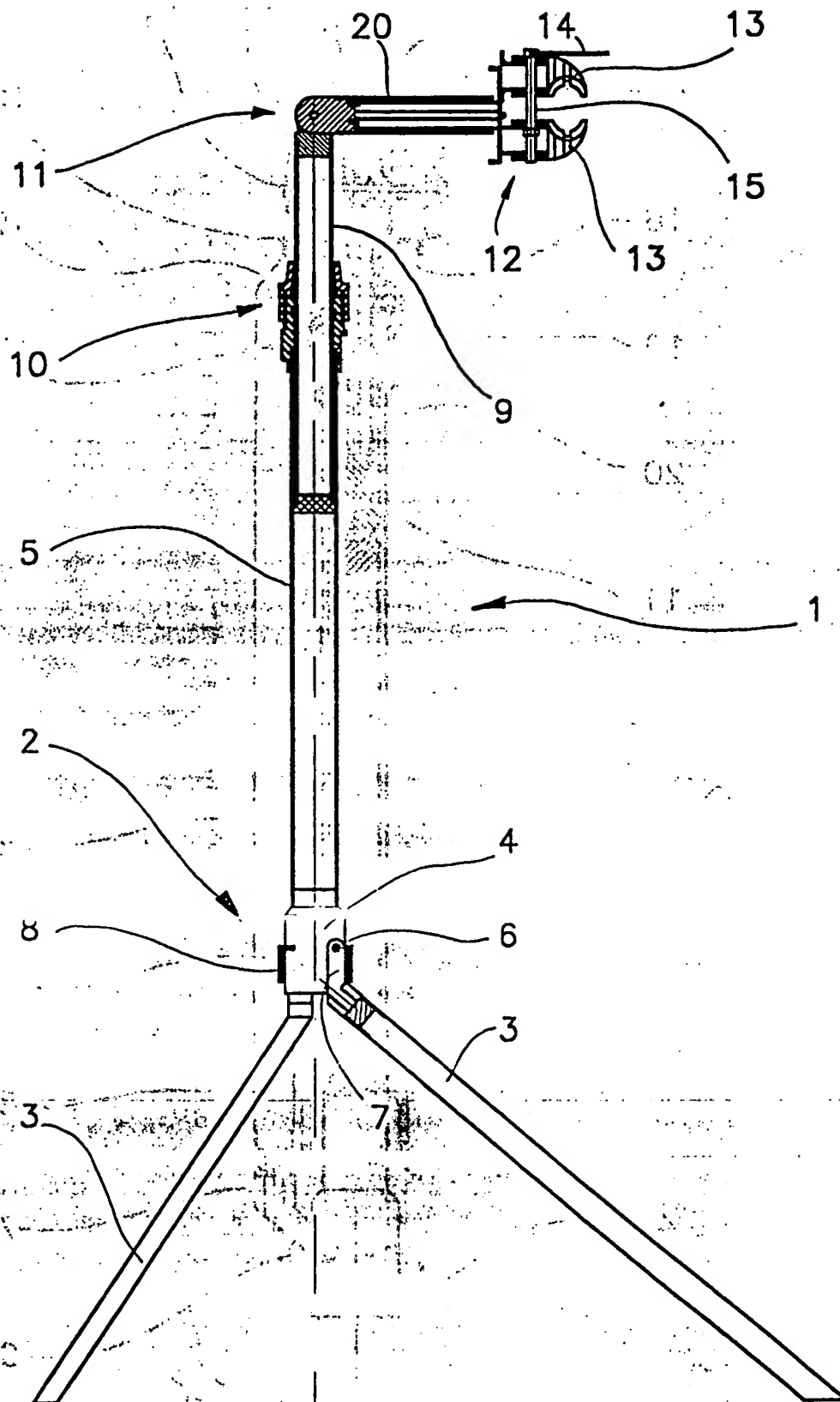


FIG. 1



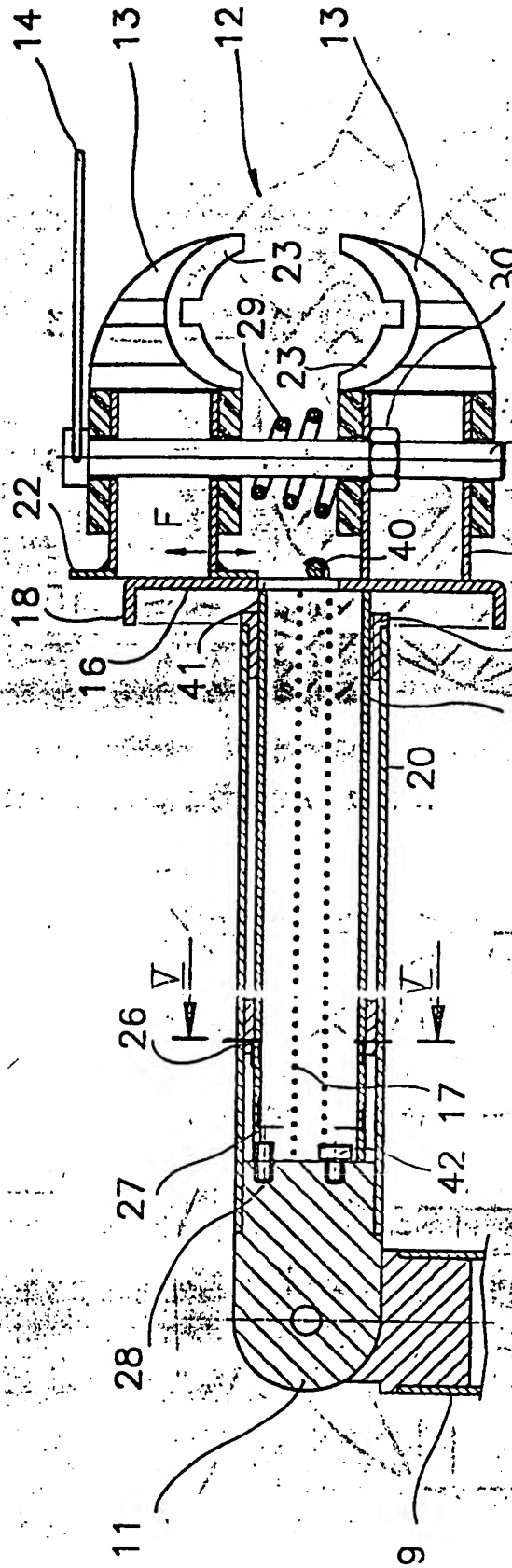


FIG. 3

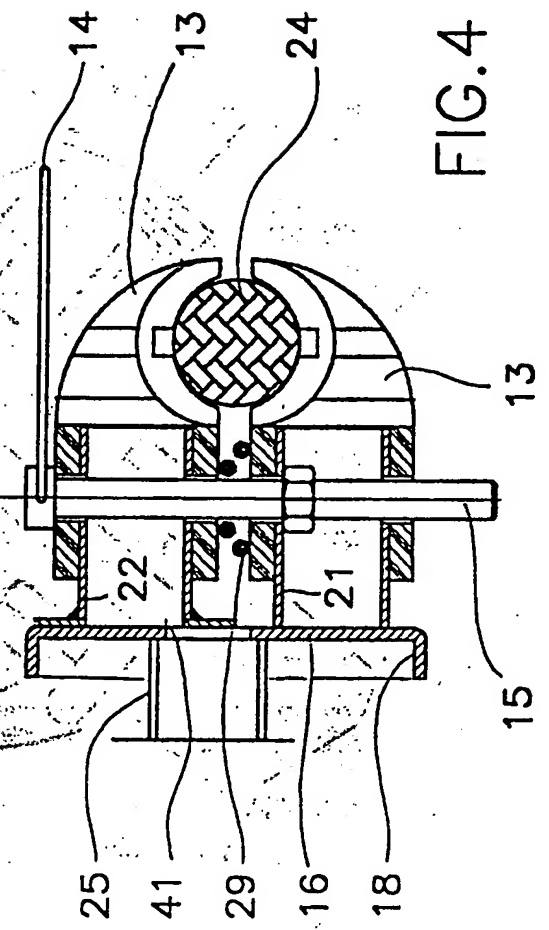


FIG. 4

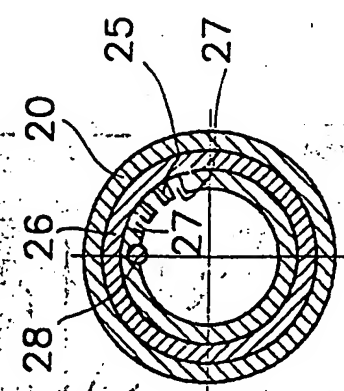
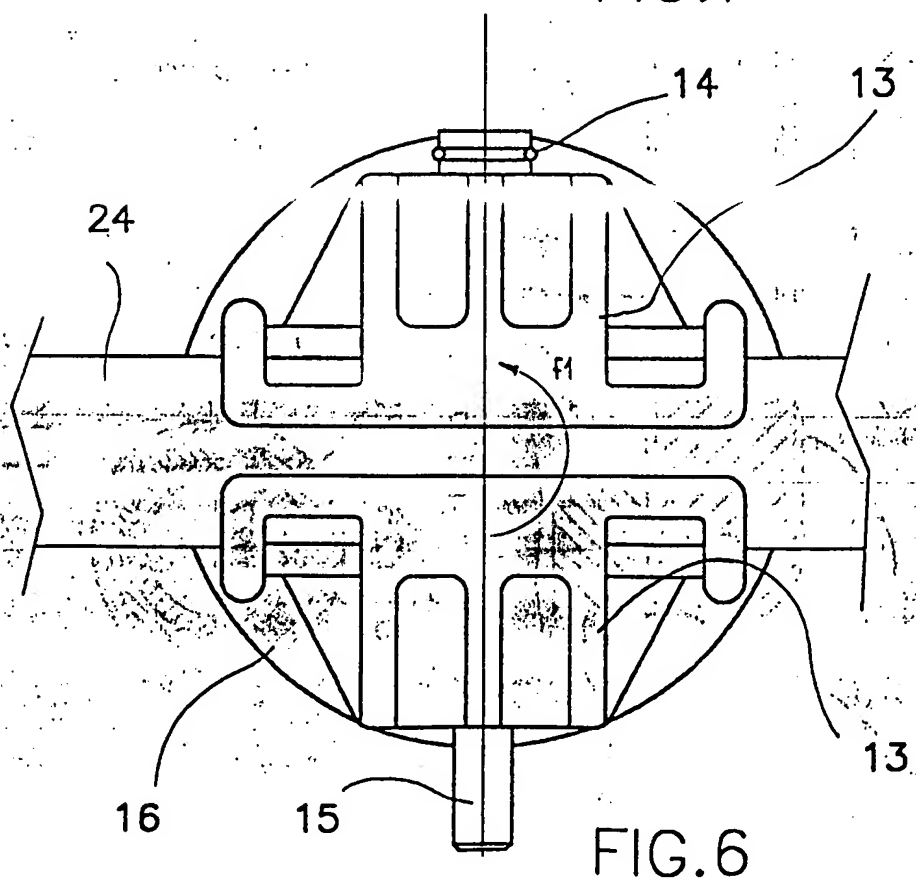
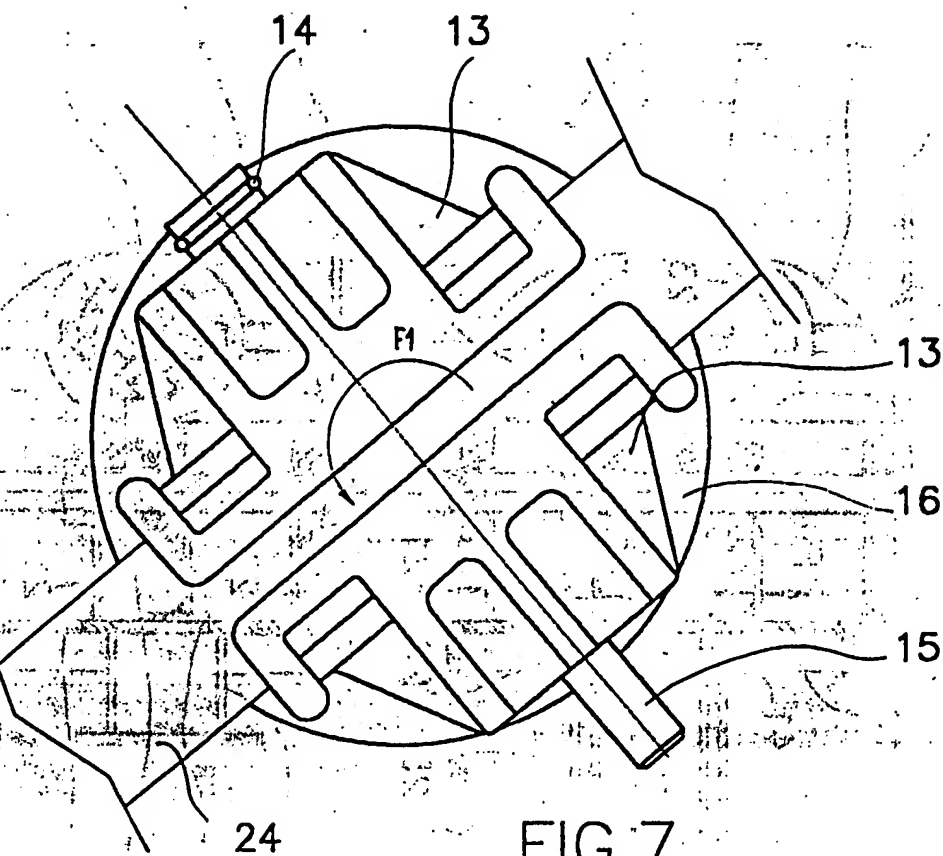


FIG. 5



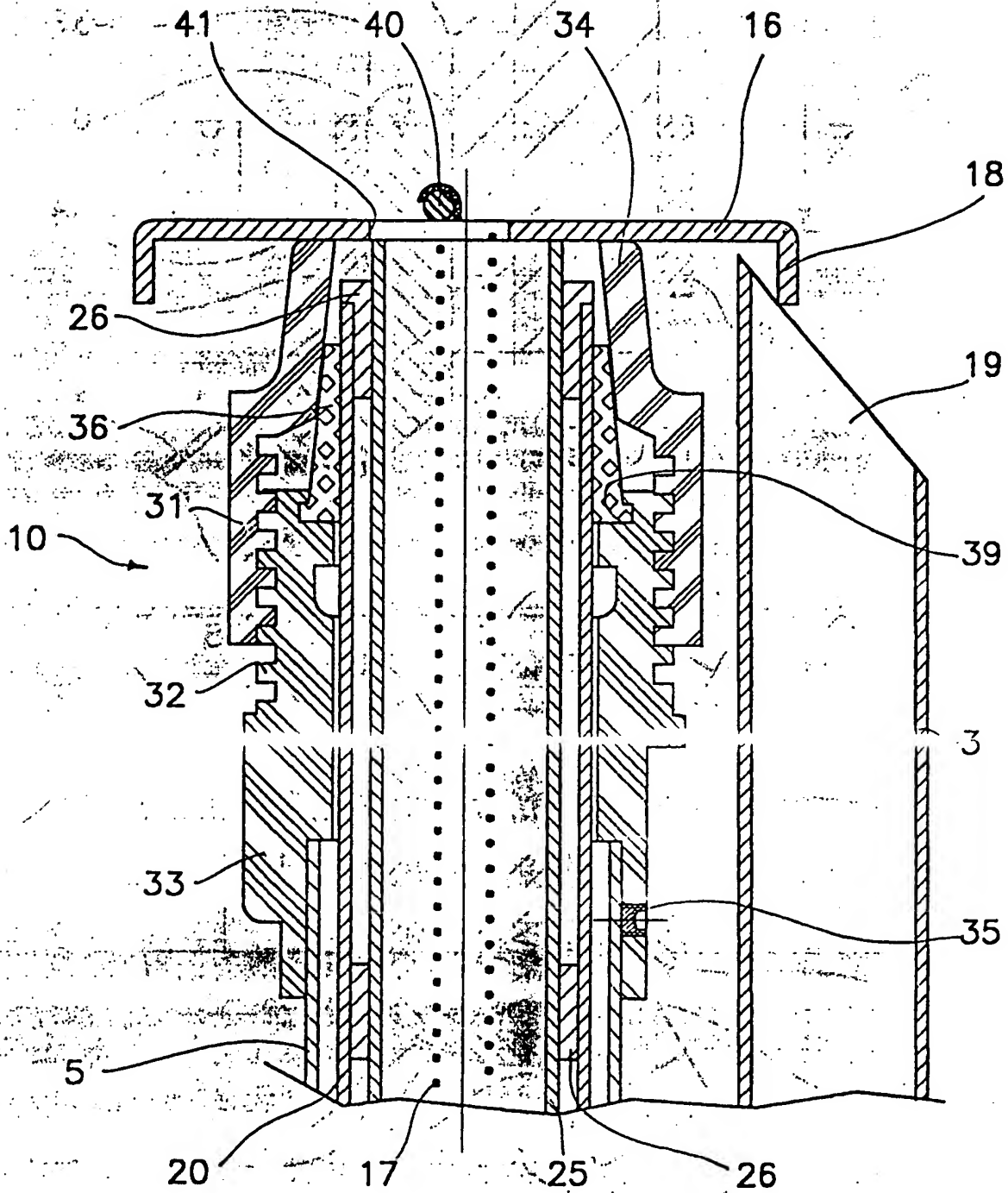


FIG.8



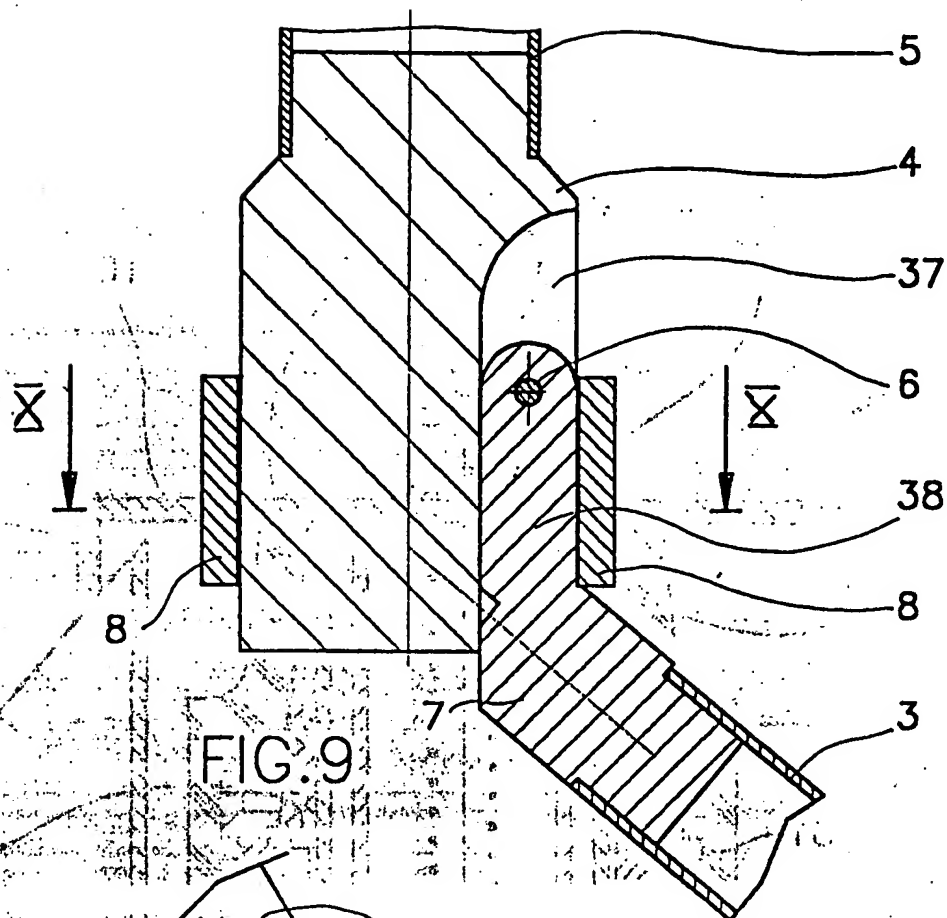


FIG. 9

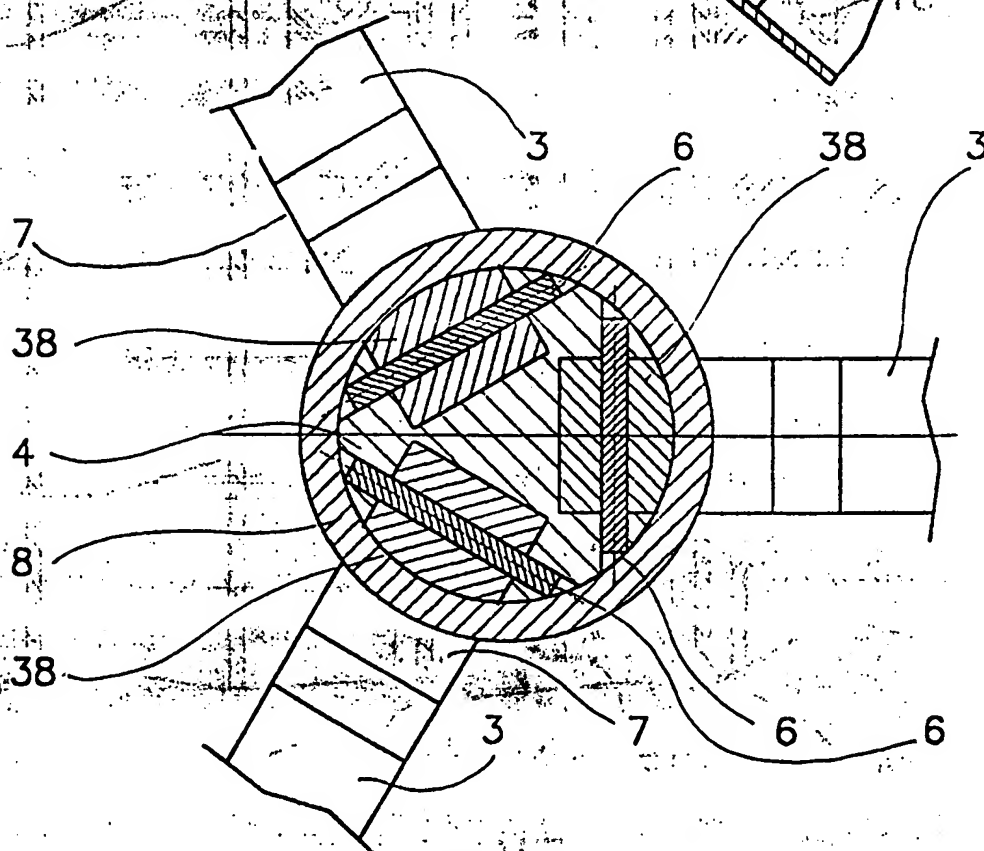


FIG. 10

## INTERNATIONAL SEARCH REPORT

National Application No

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## A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 B62H3/02 F16M11/28 F16M11/10 B25H1/00

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## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y A	DE 90 15 322 U (HEINZ) 31 January 1991 see claims; figures	1,2,7, 13,20,24 10,21-23 14,25
X	EP 0 597 150 A (MINOURA CO LTD) 18 May 1994 see column 3, line 8 - column 5, line 55; figures 1-11	1-5,7, 20,24
X Y	US 4 923 156 A (LINNÉUSSON) 8 May 1990 see column 2, line 15 - column 3, line 42; figures	1,3-5 6
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X A  Y	<p>US 4 807 837 A (GAWLIK ET AL.) 28 February 1989 see column 4; line 50 - column 5, line 49; figures</p> <p>US 5 449 138 A (CIANCIO JOSEPH) 12 September 1995 see claims; figures</p>	<p>1, 7, 8, 10-12, 17 9, 18</p> <p>21-23</p>

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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MO97A000232 23 December 1997 (23.12.97) IT(71) Applicant (for all designated States except US): FEMAK DI  
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(54) Title: SUPPORT MEANS

(57) Abstract

The support means for a bicycle frame comprises a base (2) which may be steadily coupled to a reference plane, a support body (5, 9, 20) projecting upwards from said base (2) and clamp means (12) capable of clamping a portion of an object (24) that is to be supported; the base (2) comprises a plurality of feet (3) coupled to said body (5, 9, 20) by means of hinges and rotatable from an open position in which they are remote from said body (5, 9, 20) and a closed position in which they lie substantially parallel to said body (5, 9, 20).

